Total No. of Questions : 10]

SEAT No. :

P3356

[Total No. of Pages : 3

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T.E. (Electronics Engineering)
DATA COMMUNICATION
(2015 Pattern) (End Semester)

*Time : 2½ Hours]*   *[Max. Marks : 70*

Instructions to candidates:
1) *Answers the Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8 and Q.9 or Q.10*
2) *Answer any five questions.*
3) *Neat diagrams must be drawn wherever necessary.*
4) *Figures to the right side indicate full marks.*
5) *Use of calculator is allowed.*
6) *Assume suitable dada if necessary.*

Q1) a) Explain in Detail Hub, Switches and Routers. **[6]**

     b) Write a short note on OSI model. **[4]**

OR

Q2) a) Explain in detail factors to be considered for selection of transmission media. What are the advantages of STP? **[4]**

     b) The Generator matrix of a particular (6,3) block code is given below. Find all code vectors of this code **[6]**

$$G = \begin{pmatrix} 1 & 0 & 0 & 0 & 1 & 1 \\ 0 & 1 & 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 1 & 1 & 0 \end{pmatrix}$$

Q3) a) Find the channel capacity as shown in Fig. **[6]**
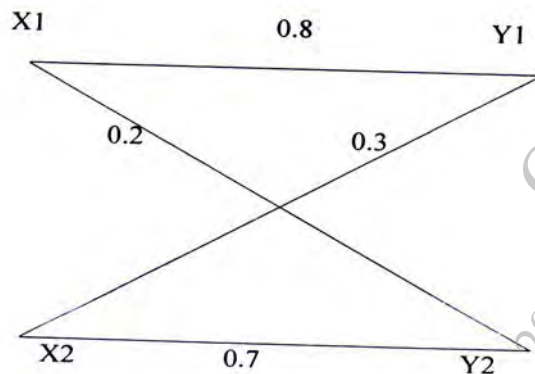
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b) Prove that H(X,Y) = H(X/Y) + H(Y)

$$H(X,Y) = H(Y/X) + H(X)$$ **[4]**

OR

Q4) a) Apply Shannon Fano coding procedure to find the coding efficiency for the following Message ensemble.

X1=1/4, X2=1/8, X3=1/16, X4=1/16, X5=1/16, X6=1/4, X7=1/16, X8=1/8
Take M=2 **[6]**

b) State and Explain Shannons therom on channel Capacity. **[4]**

Q5) a) Explain Adaptive Delta Modulation in detail with the help on transmitter and receiver. **[8]**

b) Draw the waveforms for the bit sequence 1101010011 **[8]**

i) RZ unipolar

ii) NRZ polar

iii) AMI

iv) Split phase manchester

OR

Q6) a) Write a short note on Quantization Noise and Non Uniform Quantization. **[8]**

b) ADM system is operating at 3 times the Nyquist rate for a signal with a 3 KHz Bandwidth. The quantizing step size is 250 mV. **[8]**

i) Determine the maximum amplitude of a 1kHz input sinusoid for which the delta Modulator does not show slope overload.

ii) Determine the post filtered output of SNR.

Q7) a) Explain QPSK with its Transmitter and Receiver. **[8]**

b) Compare QPSK, M-ary PSK, M-ary FSK and ASK. **[8]**

OR

Q8) a) Explain M-ary PSK in detail with the help of Transmitter and Receiver.**[8]**

b) Explain with the help of neat block diagram 16 bit QAM transmitter and receiver. **[8]**

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Q9) a) Compare FDMA, CDMA, TDMA. **[9]**

b) With the help of mathematical expressions and block diagram explain DS-SS system. **[9]**

OR

Q10) a) Consider a slow hop SS system with binary FSK that transmits two symbols per frequency hop and has a PN generator with K=3. For a binary message sequence [01 10 11 01 10 00]. Draw the spectral output. Determine the processing gain if r_b=3000 and find the bit error probability of white noise if N_0=10^{-12}W/Hz, $S_{R=}$5.4* 10^{-8}W. **[9]**

b) Write a short note on **[9]**

   i) Pure ALOHA

   ii) Slotted ALOHA

   iii) CSMA